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EXAMINER

SILVER, DAVID

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2128

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/825,572	Applicant(s) NORTH ET AL.	
	Examiner David Silver	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>20070912</u> |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. The Instant Office Action is in response to amendment filed 7/3/2007.
2. Claims 1-15 were originally presented for examination.
3. Claims 1-12 were rejected.
4. Claims 13-15 were cancelled and therefore withdrawn from consideration.
5. Claims 1-12 are currently pending in Instant Application.
6. The Instant Application is not currently in condition for allowance.

Priority

7. Priority is not claimed.

Response to Arguments

8. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Examiner Notes Regarding Applicants' Amendments

Applicants are reminded that markings are required that show all changes made to all claim. See MPEP 714.II.C. The following is an example of what appears to be a clerical oversight showing changes that were not identified.

Submitted to Office 4/15/2004:

1. A method for simulating interdependent infrastructures, comprising the steps of:

selecting a subset of an interdependent infrastructure system;
equivalencing the subset;
creating a plurality of agents to interact with the subset; and
simulating multi-scale agent interactions.

Amended as of 7/3/07:

1. (Currently Amended) A method for simulating A computer program product embodied on a computer-readable medium to facilitate: ~~comprising the steps of:~~

Selecting from a set of infrastructure systems a subset comprising a plurality of
[[an]] interdependent infrastructure systems;
equivalencing the subset;
creating a plurality of agents to interact with the subset; and
simulating multi-scale agent interactions.

Note that "S" in the word selecting is now capitalized. The first limitation has been changed substantially to include "from" and "plurality of interdependent infrastructure systems". These changes are to be marked in accordance with MPEP 714.

Future responses failing to properly identify amendments may be refused entry as having omissions / being non-compliant amendments.

Response: 35 U.S.C. § 101

9. **Background:**

Claims 1-15 stand rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

10. **Applicants argue:**

10.1 "In response to the Examiner's comments, Applicant has amended claims 1-7 to more particularly describe the system and hardware components required for use of this invention and to clarify that the claims are directed to the system, including a computer program product embodied on a computer-readable medium, and not merely software. Applicants respectfully submit that the rejection has been overcome and the claims stand in condition for allowance.

10.2 Regarding claims 8-12, Applicants note that the claims are directed to an "apparatus". The Examiner rejection has not made it clear how the claims directed to an apparatus having series of components is in fact software per-se. As such, Applicants respectfully request the rejection be withdrawn." (Remarks: page 6)

11. **Examiner Response:**

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MPEP 2106 recites, in part:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works, and a compilation or mere arrangement of data. Both types of "descriptive material" are **nonstatutory** when claimed as descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759.

- 11.1 Regarding subsection 1 *supra*, Applicants' arguments have been considered but are unpersuasive. The computer program product and the computer-readable medium are recited in the preamble of the claim, which in this instance is not given patentable weight because it is not necessary for the life, meaning and vitality of the claim. The claims remain drawn to software instructions, *per se*. Which is merely functional descriptive material and when claimed alone is not statutory.
- 11.2 Regarding subsection 2 *supra*, Applicants' arguments have been considered but are unpersuasive. Specifically, although the word "apparatus" is used in the preamble, the claims are merely drawn to software elements. Specifically, the "selector", "equivalencer", "plurality of agents", and "simulator" are all software components and do not have hardware. For example, agents are software (PGPUB paragraph 0014, 0046). Likewise, the other elements are merely software components. Additionally, merely adding the term "apparatus" to the preamble of a claim does not make claim statutory. Software components *per se* are not statutory.

Response: 35 U.S.C. § 102**12. Background:**

Claims 1-15 stand rejected under 35 U.S.C. 102(b) as being anticipated by TOPCCIP's "TAB B, Preliminary Research and Development Roadmap for Protecting and Assuring the Energy Infrastructure" ("TAB B").

13. Applicants argue:

- 13.1 "Turning to the specific limitations of the claims, the TOPCCIP reference fails to teach "[s]electing from a set of infrastructure systems a subset comprising a plurality of interdependent infrastructure systems;" as claimed in the currently amended claim 1. The present application and the claims

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specifically require that the system is acting on more than one infrastructure. One of ordinary skill in the art would appreciate, particularly in light of the Applicants usage of the term (paragraphs [0003] and [0004] among others), that infrastructure as used in the claims refers to a single infrastructure such as the electrical distribution grid or the interstate natural gas pipeline system or a local distribution system for electricity. Such systems are referred to in the art as infrastructures and considered infrastructures in their own right. The TOPCCIP reference is consistent with this usage and treats (see, for example, the image on the front cover depicting various individual infrastructures). The Examiner has merely cited to lists of infrastructures contained in the TOPCCIP reference. For example, the citation to page 18 of Tab B of the TOPCCIP reference is misplaced, as it is clear from both the heading and the context that the infrastructure being referred to is the national energy grid. The reference to interconnection of the power system does not refer to the interconnection of different infrastructures (such as the electric grid and interstate gas pipelines) but rather to the interconnection of different individual utility companies acting as either transmission entity (i.e. from power plant to substation) or as a distribution entity (from substation to end user).” (Remarks: page 7-8; emphasis by Examiner)

14. **Examiner Response:**

Applicants’ arguments have been considered but are unpersuasive and traversed as follows.

- 14.1 In response to Applicant’s argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., infrastructure systems being electrical distribution grid or the interstate natural gas pipeline system or a local distribution system for electricity) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Even though the claimed invention does not limit itself to the argued limitations, attention is directed to **(B-42)**, which discloses

“This research is not limited to the electric sector. Oil and gas pipelines are highly interconnected networks and also

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vulnerable to attacks on their imbedded information infrastructure."

This means the researched focused in the TAB B reference corresponds to the oil, gas, and electrical infrastructures. Further, attention is directed to **(B-80)**, section 3.3.3 titled "Infrastructure Interdependencies", which recites

"These infrastructures include **electric** power, **gas** and **oil** production and storage, banking and finance, **telecommunications**, transportation, **water** supply, emergency services, and government services."

It further states that:

"The electric power infrastructure is critically important for operating other infrastructures. **Each infrastructure depends to varying degrees on electric power** for systems and facilities, as well as emergency backup power. [...] The energy infrastructures **depend** strongly on computers and computing systems for operations and communication. The **energy infrastructures also depend on the oil and gas production and storage infrastructure** and on the transportation infrastructure for delivery of fuel, including coal, which supplies more than one-half of all electric generation. The energy **infrastructures also depend** on the other critical infrastructures for financial services and transactions, water supply, and emergency and government services"

From the above it is clear that the TAB B indeed discloses having infrastructures.

15. Applicants argue:

15.1 "In addition, the claims require "equivalencing the subset." Once again, the TOPCCIP reference fails to teach this limitation. As discussed above, the TOPCCIP reference does not teach the use of a subset of infrastructures but rather looks within a single infrastructure and thus no subset exists. Furthermore, the cited portion of Tab B (page 48) is referring to the calibrating of a theoretical model to the actual electrical power system. This is not equivalencing a subset of infrastructures, it is making sure that a model of an individual distribution or transmission companies system (a part of a larger infrastructure) is accurate.

15.2 While the TOPCCIP reference does include the term "equivalencing", it in fact states "[r]esearch on network equivalencing is also needed." Applicants fail to see how such a clear assertion that something is not known in the art can be the basis for a rejection." (Remarks: page 8 bottom to page 9 top)

16. Examiner Response:

16.1 Regarding subsection 1 *supra*, the Applicants' arguments are based on features not claimed. See

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section 12.1 above.

16.2 Applicants arguments in subsection 2 *supra* have been fully considered and are found persuasive.

See new grounds of rejection presented below.

17. **Applicants argue:**

17.1 "Claim 1 further requires "creating a plurality of agents to interact with the subset;" which is also not taught in the TOPCCIP reference. As already discussed, the TOPCCIP reference is related to the analysis of intradependencies within a single infrastructure. No subset representing a plurality of infrastructures is taught and thus no agents are described as interacting with such a subset. At best the TOPCCIP reference teaches that it would be desirable to have some form of automation within an infrastructure (not between infrastructures). The teachings of the cited page 23 and the preceding page 22 make it clear that the TOPCCIP reference is referring to a reasoning element for handling a infrastructure.

Finally, Claim 1 requires "simulating multi-scale agent interactions." Again, for at least the reasons discussed above, the failure of the TOPCCIP reference to contemplate interdependencies between infrastructures means one of ordinary skill in the art would appreciate that the simulating of multi-scale agent interactions in regard to multiple infrastructures would not be possible.

For at least the above reasons, the rejection of the claims should be withdrawn and Applicants request allowance of the claims." (Remarks: page 9)

18. **Examiner Response:**

This issue has been addressed in the new grounds of rejection and explanation provided above.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

19. Claims 1-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

19.1 In this instance, absent an explicit and deliberate definition in the specification that the product

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includes an appropriate medium or hardware elements, the claims are directed to software, *per se*.

The elements of claim 8, for example, are disclosed to possibly include software elements, *per se*.

Therefore, they are not drawn to structural hardware elements; thus, they are drawn to non-

statutory subject matter. **(Specification [0007] [0006] [0046])**

MPEP 2106 recites, in part:

"...USPTO personnel shall review the claim to determine it produces a useful, tangible, and concrete result. In making this determination, the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather on whether the final result achieved by the claimed invention is "useful, tangible, and concrete." (emphasis added)

19.2 The method claims do not produce a useful, tangible, and concrete final result. The steps of the method claims do not produce a useful, tangible, and concrete result. They merely recite a software algorithm, *per se*, which, for example, does not display, store, or otherwise provide a useful tangible output. Note exemplary claim 1 which only recites software steps and does not produce a useful tangible and concrete final result. See MPEP 2106 [R-5] (partially recited above).

19.3 The computer program product and the computer-readable medium are recited in the preamble of the claim, which in this instance is not given patentable weight because it is not necessary for the life, meaning and vitality of the claim. The claims remain drawn to software, *per se*.

20. Although the word "apparatus" is used in the preamble, the claims are merely drawn to software elements. Specifically, the "selector", "equivalencer", "plurality of agents", and "simulator" are all software components and do not have hardware. For example, agents are software (PGPUB paragraph 0014, 0046). Likewise, the other elements are merely software components. Additionally, merely adding the term "apparatus" to the preamble of a claim does not make claim statutory.

21. The claims remain drawn to non-statutory subject matter.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

22. Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the **enablement requirement**. The claim(s) contains subject matter which was not described in the

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specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 1, 5, 6, 7, 8, and 9, the limitation of "equivilancing a subset" / "re-equivilancing" is not enabled. Specifically, the Specification does not describe the subject matter in such a way as to enable one skilled in the art would be able to make and use the invention without undue experimentation. The step of equivilancing is not adequately enabled; thus raises a deficiency in all claims.

As per claim 5, 10 , the limitation of "calculating flow limit" is not enabled. Specifically, what is a "flow" if an infrastructure? How is it calculated? What is a "flow limit"? The only references to "flow limit" are in PG PUB Spec para 51, which are recited below. None of the citations explain what the flow is, or what the flow limit is.

"physical infrastructure is modeled to the level of detail required to reproduce aggregate system features, such as total energy flow" (para 46 - what is "energy flow" and how is it quantified?)

"At step 908, the equivalencer calculates the flow limit for one of the components identified in step 906. At step 910, the equivalencer determines if there are components that were identified in step 906 that have not had a flow limit calculated for." (para 50 - does not explain what a flow limit is)

"The properties of these agents may be set to the flow limits calculated during the equivalencing done at step 900." (para 51 - does not explain what a "flow limit" comprises.)

23. Claims not specifically mentioned are rejected by virtue of their dependency.

24. Applicants are required to review the claims for other similar deficiencies and respond accordingly.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or

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(g) prior art under 35 U.S.C. 103(a).

25. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over TOPCCIP's "TAB B, Preliminary Research and Development Roadmap for Protecting and Assuring the Energy Infrastructure" ("TAB B"), and further in view of Official Notice taken.

TAB B discloses: 1. a computer program product embodied on a computer-readable medium to facilitate: selecting from a set of infrastructure systems a subset comprising interdependent infrastructure systems (**B-80; page B-1 middle, B-18 middle, B-57 middle; B-42; section 3.2.2, section 3.3 in general**); creating a plurality of agents to interact with the subset (**TAB B: B-23 top**); and simulating multi-scale agent interactions (**B-21 middle, B-25 bottom, B-41 middle, B-47 bottom half**).

Although TAB B discloses selecting a single subset comprising a single infrastructure (**B-82 para 1**), TAB B does not expressly disclose: selecting from a set of infrastructure systems a subset comprising a plurality of interdependent infrastructure systems, and equivalencing the subset. Official Notice is taken with respect to this limitation. TAB B provides explicit motivation in the selection of subsets as claimed in (**B-82 top**), by stating:

"Traditional modeling and simulation tools, while capable of addressing a subset of these issues for a portion of a single infrastructure, are not computationally capable of addressing the complexities and uncertainties associated with these issues on a national level. In particular, the number of infrastructure dependencies and dynamic feedback loops that need to be considered is prohibitively large (i.e., computationally intractable). New computational algorithms and supercomputing capabilities have the potential for efficiently and effectively addressing these modeling and simulation shortfalls. With enhanced computational capabilities, it would be possible to comprehensively address, for the first time, infrastructure dependencies and real-time interactions within a technical, economic, and security framework." (emphasis by Examiner)

TAB B also provides explicit motivation for "equivalencing", as claimed, on page B-48, by stating:

"Accurate models of the system. The August 1996 western outage revealed that system models had not been adequately calibrated or tested for the unusual circumstances and event sequence that led to the outage. Model calibration is expensive and needs to be improved. Research on network "equivalencing" is also needed."

The two "missing" features from the primary references are clearly set forth as the intended path and guidance in the disclosure of TAB B. They provide for the market force, the drive, and the motivation in

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doing so.

It is further noted that in accordance with *set theory* selecting a whole set is identical to selecting a subset which contains all elements of the set. Therefore, selecting a whole set is equivalent and identical to selecting a subset containing all elements of the set.

TAB B discloses: 2. The product of claim 1, wherein the subset is being selected to represent a geographic region **(B-19 middle, B-32 middle, B-35 top half, B-49 top half, B-50 top half)**.

TAB B discloses: 3. The product of claim 1, further comprising the steps of: selecting components for two way analysis, and wherein the simulation occurs across concurrent time **(B-25, B-5 top, B-9 top, B-20 bottom; Table B.4 item 6.2)**.

TAB B discloses: 4. The product of claim 1, further comprising the steps of: selecting a plurality of infrastructures to simulate; and connecting the infrastructures, including the steps of screening candidate interconnections **(B-49 bottom half: screening tools)**; and assigning candidates a likelihood of connection **(B-11 top)**.

TAB B discloses: 5. The product of claim 1, wherein the equivalencing step includes the steps of: identifying connections extending outside of the subset **(B-3 middle; B-54 bottom half)**; and calculating flow limit for each connection extending outside the subset **(B-71 middle; B-72 middle)**.

TAB B discloses: 6. The product of claim 1, wherein the creating agents step includes the steps of: creating agents from templates and data for a infrastructure; and creating agents at equivalenced connections **(B-48 bottom; Table B.6 item 1.4; B-50 top)**.

TAB B discloses: 7. The product of claim 1, wherein the simulating step includes the steps of: advancing agent conditions through time; re-equivalencing the infrastructure **(B-5 middle)**; and continuing the simulation until a steady state is achieved **(B-47 middle)**.

As per claims 8-12, note the rejection of claims 1, 4-7, 1, 5, 7 above, respectively. The Instant Claims recite substantially same limitations as the above-rejected claims and therefore rejected under same prior-art teachings.

Support for Amendments and Newly Added Claims

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26. Applicants are respectfully requested, in the event of an amendment to claims or submission of new claims, that such claims and their limitations be directly mapped to the specification, which provides support for the subject matter. This will assist in expediting compact prosecution. MPEP 714.02 recites: "Applicant should also specifically point out the support for any amendments made to the disclosure. See MPEP § 2163.06. An amendment which does not comply with the provisions of 37 CFR 1.121(b), (c), (d), and (h) may be held not fully responsive. See MPEP § 714." **Amendments not pointing to specific support in the disclosure may be deemed as not complying with provisions of 37 C.F.R. 1.131(b), (c), (d), and (h) and therefore held not fully responsive.** Generic statements such as "Applicants believe no new matter has been introduced" may be deemed insufficient.

Requests for Interview

27. In accordance with 37 CFR 1.133(a)(3), requests for interview must be made in advance. Interview requests are to be made by telephone (571-272-8634) call or FAX (571-273-8634). Applicants must provide a detailed agenda as to what will be discussed (generic statement such as "discuss §102 rejection" or "discuss rejections of claims 1-3" may be denied interview). The detail agenda along with any proposed amendments is to be written on a PTOL-413A or a custom form and should be faxed (or emailed, subject to MPEP 713.01.I / MPEP 502.03) to the Examiner at least 3 days prior to the scheduled interview. Interview requests submitted within amendments may be denied because the Examiner was not notified, in advance, of the Applicant Initiated Interview Request and due to time constraints may not be able to review the interview request to prior to the mailing of the next Office Action.

Conclusion

28. All claims are rejected.

29. The Instant Application is not currently in condition for allowance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Silver whose telephone number is (571) 272-8634. The examiner can normally be

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reached on Monday thru Friday, 10am to 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application

Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/ DS /

David Silver, Patent Examiner
Art Unit 2128


KAMINI SHAH
SUPERVISORY PATENT EXAMINER